



PATENT

Attorney Docket No.: 36522-
195046

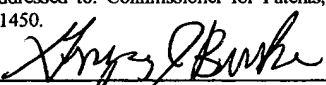
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Patent application of :
Bruce L. Bruso :
Serial No.: 10/817,498 : Group Art Unit:
3673
Filed: April 2, 2004 : Examiner:
Kreck, John J.
For: Method of In Situ Blending of Soil to :
Reduce Concentration of Toxic Residue in :
the Soil :

Declaration Under 37 C.F.R. 1.132 of Eric B. Schmidley P. G.

I, Eric B. Schmidley, hereby declare as follows:

1. I am a Professional Geologist (license no. 691) registered in the State of Pennsylvania and Program Manager for the Pennsylvania office of Apex Environmental, Inc. (Apex). Apex is a comprehensive environmental, health and safety and engineering company specializing in environmental consulting and remediation services. I have been employed by Apex since September 28, 1998, and have been involved in environmental consulting and

CERTIFICATE OF MAILING UNDER 37 C.F.R. 1.8(a)	
I hereby certify that this paper, along with any paper referred to as being attached or enclosed, is being deposited with the United States Postal Service on the date indicated below, with sufficient postage, as first class mail, in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.	
BY	
DATE:	March 29, 2005

remediation since December 1986. I have Bachelor of Science and Masters of Science degrees in Geology.

2. I am familiar with regulatory provisions in several states which permit remediation of pesticide contaminated soil in agricultural sites to permit residential land use, such as Pennsylvania Department of Environmental Protection (PADEP) Act 2 (brownfield) regulations and the New Jersey Voluntary Clean-Up Program. I am also familiar with the publication entitled *Findings and Recommendations for the Remediation of Historic Pesticide Contamination*, Final Report - March 1999 (hereafter “ New Jersey Report”) by the New Jersey task force on the problem of residual soil contamination by historical pesticide use.

3. The New Jersey Report identifies the history of pesticide use in New Jersey and the health risk posed by residues that are left in the soil from breakdown of the various pesticides. It also evaluated and approved in concept six (6) remediation options:

- (1) Consolidate contaminated soil under roads and other permanent physical structures.
- (2) Cap contaminated soil with clean topsoil.
- (3) Blend with clean soil within the contaminated area of concern. (The clean soil may be already in the area or be from another area on-site, or be trucked to the area from off-site)
- (4) Blend with clean soil outside of the area of concern but within the site. (Again, the clean soil may be taken from the site or trucked in from off-site.).
- (5) Excavation and removal of contaminated soil and replacement with clean soil
- (6) Innovative soil treatment technologies (unspecified, but usually chemical or biological reagent treatments).

4.. The New Jersey Report acknowledged that the blending options (3) and (4) represented a significant departure from Department policy, but the Task Force recommended it for the practical reason of mitigating the costs and the likelihood that some of the other methods might be impractical for other reasons. The options which leave covered-over areas of high concentration, options (1) and (2), require use restrictions and deed notices of the restrictions to prevent later exposure of the contamination. Excavation and removal, option (5), and technological treatments, option [item (6)], may be prohibitively expensive. The New Jersey Report's estimated costs show that blending with clean soil from on-site (whether in the area of concern or outside of it) is potentially the cheapest option. It also states, however, that "Blending may not be a practical option if contaminant levels are very elevated because large amounts of clean soil would be needed or if there are potential ground water impacts."

5. I am also familiar with the vertical soil blending treatment method invented by Mr. Bruce Brusco and provided as a remediation service by his company, CBA Environmental Services Inc. (CBA). I became aware of it when Apex engaged CBA to do blending tests, and thereafter to perform the blending remediation on a site with residual arsenic contamination from pesticide use. The arsenic concentrations at the surface were well over the 12mg/kg standard set by PADEP Act 2 Statewide Health Standards for direct contact. A plow test had been conducted on the site years earlier (1996) to estimate whether blending might be a feasible option. The test was described by the environmental consultant engaged by the owner as being analogous to a developer removing and stockpiling soil from the site during construction, then redistributing the soil (having been mixed by the removal and stockpiling). The test actually consisted of using a farm plow to overturn and mix the upper 8-12 inches in some sample areas. The plow test indicated some reduction in arsenic concentration at the surface, although not sufficient to reach

the standard. The purpose of the test, however, was to emulate removal and stockpile mixing, rather than demonstrate vertical soil mixing.

6. After Apex became the remediation consultant, I arranged for actual removal and stockpile tests to be conducted in July 2003. In eight sample lots, the subcontractor used track excavators and loaders to remove the top 12-18 inches of soil and transported it to an on-site stockpile by dump truck. The stockpile was approximately 7,000 cubic yards of soil. Test samples at random locations in the stockpile indicated that the average concentration of arsenic was only reduced to about 46% of initial surface concentration in the sample lots, and was still over three times the 12mg/kg standard. To use this method for the entire site would have required the developer to bring-in a large volume of clean soil.

7. I then asked Mr. Bruso to demonstrate whether CBA could do the remediation at less cost. CBA brought to the site a modified track trencher that it calls a MITU LVR (large volume remediator) and explained to me that the machine was modified so that the soil would not be excavated to form a trench, but instead the machine would lift and churn the soil until it was uniformly blended in the vertical zone of the rotating teeth.

8. CBA demonstrated the machine in six test pits. I was surprised to see how deeply the machine could reach. The pits ranged from 7 to 13.5 feet deep. The post-blending samples taken from each pit showed arsenic concentration well below the 12mg/kg standard. Based upon these tests, we contracted CBA to remediate the site. The project was successfully completed in short time at far less cost than importing clean fill.

9. From my discussions with Mr. Bruso and observing the CBA remediation, I have come to understand the advantages it has over traditional blending methods, including removing the surface soil to a stockpile and mixing it there. Mr. Bruso's method uses the soil directly

below the contaminated surface layer as the clean soil volume needed for the blend, and as the test pits show, it can go down to several times the depth of the contaminated layer if needed. The blending it achieves is essentially homogenous distribution of the contaminant from the surface to that depth. For example, if the average surface concentration is determined to be 48 mg/kg in the top 1.5 feet (the usual depth of an arsenic pesticide residue profile), a six foot blending depth would reduce the concentration to 12mg. Since the MITU machines can go to double that depth or more, the vertical blending can usually achieve the regulatory standard.

10. The vertical blending also allows for a more plot specific remediation plan. Instead of removing and stockpiling the top 12-18 inch layer from all of the area of concern, CBA is able to use core samples to plot the hot spots and the concentration levels in those areas. This allows them to set the blending depth as needed for the particular spots, and to by-pass the acceptable areas between the spots. In addition to saving time and cost, this also eliminates spreading the pesticide residue onto formerly clean surfaces.

11. Consequently, I regard Mr. Bruso's vertical blending method as a new and far superior method to any of the blending options that I have seen or heard of. I will recommend it to developers and landowners with pesticide contaminated sites, and have offered to conduct a seminar with Mr. Bruso to educate developers and landowners to its benefits. I will recommend that developers use Mr. Bruso's vertical blending even before site grading, so that the soil moved around during the grading will already be below acceptable standard.

12. I expect that Mr. Bruso's blending method will quickly become the preferred method of remediating agricultural land from pesticide residue, and a great commercial success for him.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.



Date: February 24, 2005

Eric B. Schmidley, P.G.